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### Feature Articles - An Introduction to Tourism Satellite Accounts

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#### INTRODUCTION

In March 1995 the House of Representatives Standing Committee on Banking, Finance and Public Administration conducted its 'Inquiry into the Impact of Australia's Taxation Regime on the Tourism Industry' and recommended in its report, **Taxing Relaxing**, that:

'the Australian Bureau of Statistics, in consultation with the Bureau of Tourism Research and other interested organisations, be provided with the resources to develop a statistical system for quantifying the significance of tourism in Australia as a matter of priority.' (House of Representatives Committee Report, **Taxing Relaxing**, page xv)

The basis for such a recommendation is that there remains limited economic information on tourism despite observations suggesting that the economic impact of visitors is substantial in many regions. This paper addresses the need for a tourism statistical system by examining the nature and usefulness of a Tourism Satellite Account (TSA). A TSA has been recognised internationally as the optimal method for measuring the economic contribution of tourism (footnote 1) and as an important information base for the calculation of its economic effects. Importantly, a fully developed TSA would provide a comprehensive picture of the economic structure of Australian tourism activity.

The primary component of a TSA is a supply-use (footnote 2) table. This table will show demand for various tourism related commodities by domestic and overseas visitors and will also show the output of tourism related industries and the associated inputs and costs of those industries. The size of tourism related activity compared to other economic activity will be able to be determined from this table. A TSA also provides data on capital expenditure, employment, and other tourism indicators.

The paper begins by defining some concepts of tourism measurement. It then describes the form of a TSA with particular attention to the structure of a tourism supply-use table. The difficulties of measuring tourism within current economic frameworks are discussed. The paper then addresses the method by which the contribution of tourism to the economy can be calculated. The calculations are based on national accounting identities and these identities are explained. In the final section the benefits of a TSA are described.

#### CONCEPTS OF TOURISM

An important distinction concerns the difference between travel and tourism. Travel is a broad

concept which includes commuting to a place of work, migration and travel for business or leisure. The concept of tourism forms a subset of travel. The World Tourism Organisation (WTO) recommendations state:

'Tourism comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes.' (WTO, **Recommendations on Tourism Statistics**, para 9.)

Effectively, the distinction between travel and tourism is based on the purpose of the travel. The WTO defines 'travellers' as all persons who make trips of any kind but then separates travellers into 'visitors' and 'other travellers'. The recommendations note that '[a]ll types of travellers engaged in tourism are described as visitors.' (WTO, **Recommendations on Tourism Statistics**, para 19.) The scope of a TSA is limited to tourism and focuses on the activities of visitors rather than travellers.

The WTO definition of a visitor is

'any person traveling to a place other than that of his/her usual environment for less than 12 months and whose main purpose of trip is other than the exercise of an activity remunerated from within the place visited.' (WTO, **Recommendations on Tourism Statistics**, para 20)

Importantly, this definition includes those visitors traveling for business purposes. Throughout the paper the term 'visitor' will be used in preference to the term 'tourist' in order to remain consistent with WTO recommendations.

The other definition of interest is tourism expenditure. This is one of the key measures of tourism economic activity and is defined by the WTO as

'the total consumption expenditure made by a visitor or on behalf of a visitor for and during his/her trip and stay at destination.' (WTO, **Recommendations on Tourism Statistics**, para 85).

Consistent with the definition of visitors, tourism expenditure includes expenditure by business visitors. However, an important limit to tourism expenditure is that it only includes transactions between a visitor and the business with whom the visitor has direct contact. Therefore, tourism expenditure includes the purchase of fuel by a visitor but excludes any purchases by the service station retailer needed to sell fuel to a visitor. Currently, transactions between visitors and non-market producers, such as government, who produce services for which visitors are charged at less than the full cost of production, e.g., museums and information bureaus, are only included in the WTO recommendations to the extent of the charge paid by the visitor. Conceptually, tourism expenditure should encompass the full value of the service provided by non-market producers to visitors and not just the nominal charge. Finally, the WTO recommendations explicitly exclude expenditure on items of a capital nature such as cars, caravans and holiday homes.

## THE FORM OF A TSA

The concept of a satellite account is conceptually linked to the general method of economic measurement known as national accounting. The national accounts for a particular country or region are a comprehensive set of economic data which allow analysis of almost all parts of economic production. However, the structure of the national accounts leaves some sections of the economy not adequately identified. The concept of a satellite account has been conceived to overcome some of these structural problems by focusing on particular areas of interest while using relevant concepts and structures of the central accounts. A TSA involves the identification

of tourism within the current national accounting framework such that a complete and comprehensive set of economic data on tourism can be compiled.

To measure the economic structure of tourism it is necessary to consider the concepts of supply and demand which are the building blocks of economics. A TSA should contain economic data on those industries which supply commodities purchased by visitors, and data on expenditure by visitors on those commodities. Note that throughout the paper the term 'commodity' refers to both goods and services. Examples of economic data within this scope are:

- Tourism expenditure by households and non-residents;
- Tourism expenditure by business and government;
- Total output of tourism related activities;
- Employment in tourism related activities; and
- Numbers of visitors.

In order to place these data in an integrated and meaningful context, a TSA contains two dimensions. One dimension focuses on expenditures and output. This view will provide the basic economic structure of tourism in terms of supply and demand relationships. Importantly, this view will also allow a quantification of the size of tourism relative to other types of economic activity. Indirectly, the estimation of the impacts of tourism can be calculated using data in the first dimension. The second dimension identifies factors which will impact on the economic structure of tourism. Examples are employment, capital expenditure and overseas arrivals and departures. The aim is to present data on these factors such that they can be related to the economic structure defined in the first dimension. This will not only assist in quantifying the effects of variables such as capital expenditure but will also add significantly to the value of physical measures of tourism, such as arrivals and employment data.

The need to construct a satellite account which presents supply and demand relationships for tourism is because tourism is not separately identified in the structure of the national accounts. In part, this is due to the nature of tourism. Tourism is a demand based concept and the measurement of its economic role begins with the measurement of commodities purchased by visitors. Conversely, other activities are analysed, in the first instance, from the perspective of the producer. Four aspects can be identified which point to the diverse range of tourism related commodities and tourism related industries:

- i. not all output of tourism related industries is purchased by, or on behalf of, visitors;
- ii. not all commodities purchased by, or on behalf of, visitors are supplied by tourism related industries;
- iii. not all tourism related industries produce the same type of output; and
- iv. tourism related industries often produce more than one type of output.

As noted, a direct effect of these four aspects of tourism is that existing economic industry and commodity definitions do not identify data on tourism separately. Generally, commodity and industry definitions rely on observable similarities in form or structure but tourism does not hold either of these qualities. Rather, tourism is defined by the fact that the consumer is a visitor and visitors are of many types buying many different commodities. Therefore, while visitor expenditure can be observed, it cannot be constrained to a single item within existing industry and commodity structures. The difficulty of untangling and defining tourism flows is substantial. The aim of a TSA is to address this problem and identify tourism appropriately.

As an example of the framework for describing the first dimension consider Table 1.

Table 1 is a rudimentary tourism supply-use table which shows the relationship between two tourism commodities, accommodation and meals, and the producing industries, hotels and restaurants. Information on industries is contained in the first two columns of data and information on commodities is contained in the first two rows. For ease of illustration it is assumed that each industry produces only one commodity and that each commodity is only produced by one industry.

Table 1 shows that in producing its output the hotel industry spends 40 on inputs of goods and services, (e.g. linen, cleaning materials), 160 on wages, pays 5 in indirect taxes (rates) and generates an operating surplus (return to the hotel owners) of 95. Essentially, this column represents a production function for the hotel industry. A production function for the restaurant industry can also be described from Table 1. For the commodity 'accommodation', total expenditure equals 300 which is purchased by visitors and non-visitors. This row represents a demand function. A demand function for meals can also be described. The table as a whole represents a combination of demand and production functions for each of the industries and commodities defined.

The data in this table can also be used to estimate tourism's contribution to the national accounts measure of production, Gross Domestic Product. A later section of the paper describes the methodology of estimating tourism's contribution and uses the data in Table 1 to derive estimates.

**TABLE 1. DIMENSION 1**

	Industries		Expenditure by visitors	Expenditure by non-visitors	Total expenditure
	Hotels	Restaurants			
Commodities					
Accommodation			290	10	300
Meals			100	100	200
Commodity inputs	40	100			
Wages	160	60			
Operating surplus	95	40			
Indirect taxes	5	0			
Total production	300	200			

(data are illustrative only)

In a broader, economy wide case, more industries and commodities would be included. Also, expenditure categories can be expanded to separate expenditure, for example, by business travellers, non-residents or same day travellers. Table A1 in the Appendix is an example of a possible form of a complete tourism supply-use framework.

Table 2 is an example of the framework used in the second dimension of a TSA. Recall that this dimension seeks to identify additional economic factors which relate to tourism.

**TABLE 2. DIMENSION 2**

	Industries		Visitor nights ('000)	Number of visitors ('000)
	Hotels	Restaurants		
Commodities				

Accommodation		3500	43
Meals		0	43
Employment ('000)	63	25	
Capital expenditure (\$m)	13	5	
Capital stock (\$m)	200	60	
Average capacity utilisation	0.7	0.6	

(data are illustrative only)

In the table those factors with an industry dimension are placed to correspond to industry data in Table 1 and, similarly, those factors with a commodity or demand perspective are placed accordingly. Thus it is possible to compare employment in the hotel industry with wages in that industry or visitor nights with expenditure on accommodation. While the data in Table 2 are valuable in themselves, significant analytical synergies are gained in developing a framework which allows these data to be readily compared to the type of data in Table 1.

In summary, the content of a TSA has two dimensions with each dimension providing different analytical possibilities both singularly and in combination. The remainder of the paper focuses on the first dimension but this focus is not to discount the importance and relevance of the second dimension or, in other words, a complete TSA.

## THE SUPPLY-USE APPROACH

Both the demand and the supply side aspects of tourism economic activity need to be included in a TSA in order to derive an analytically meaningful set of data. The Canadian TSA and the WTO approach use a supply-use framework to present the structure of tourism demand and supply. The WTTC, while emphasising the expenditure side of tourism, also recognises the value of supply side estimates, such as employment, and utilises a supply-use approach as a separate part of its methodology. The OECD also proposes the use of a supply-use framework.

A TSA links supply-use estimation techniques and national accounts concepts and definitions. While the data requirements are extensive and estimation methodologies are necessarily detailed there are sound reasons for its use in measuring tourism economic activity:

- i. Analysis of both the demand and the supply sides means that the complete economic structure of tourism can be estimated. This is important in terms of both policy making and industry analysis.
- ii. From a national accounting perspective both demand side and supply side information is required in order to measure accurately the contribution of tourism using national accounting identities.
- iii. A supply-use approach directly assists in the development of economic impact models. Such models can be used to estimate the effect of tourism on the economy as a whole and can be used to determine the effect that particular shocks (e.g. tax changes) may have on tourism related parts of the economy.
- iv. A fundamental identity of the supply-use approach is that the total supply of goods and services must equal total use. The use of this relationship in estimation allows identification of data inconsistencies and can therefore assist in developing data collection strategies.

Currently, the ABS compiles national supply-use tables which show the supply and use of goods and services for the whole economy. The tables provide estimates of final demand, total output, intermediate consumption, returns to capital and entrepreneurship, wages and salaries and other

economic variables. Importantly, the tables are constrained by the relationship that total supply of commodities must equal total use. The current supply-use framework identifies approximately 1100 commodities and 107 industries. Ideally, the estimation of a tourism supply-use table would require the identification of the tourism component of demand for each of the 1100 commodities and then allocation of the supply of those commodities to particular industries. The allocation to industry would identify tourism related industries and thus a complete picture of the economics of tourism would be obtained.

## **ESTIMATING THE ECONOMIC CONTRIBUTION OF TOURISM**

An important result that can be obtained from a tourism supply-use table is the estimation of the contribution of tourism to the total economy. In estimating this contribution the link between satellite accounts and the national accounts is essential. Through this link the concepts and methodologies used to measure other parts of the economy can be applied to tourism. The following discussion outlines how the contribution of tourism can be measured in a national accounting framework.

### **National accounts measurement : the approaches**

The measurement of the economy in a national accounting framework is centred on the concept of economic production. The measure most commonly used is Gross Domestic Product or GDP. This is the measure of the total value of output by an economy less the costs of producing that output over a period of time. It is important to deduct the costs of producing the output since much output is actually an input into other products. For example, oil becomes petrol. Oil is output of the mining industry but becomes an input for producing petrol.

National accountants measure the value of total production in three, theoretically equivalent ways. The first method measures the total value of output of all goods and services and subtracts the total cost of goods and services involved in producing that output. This derives GDP(P), the production measure. This approach is also known as the value-added approach since it is a measure of the amount an economy earns (the value-added) in the production process.

The second method involves summing the incomes earned by owners of the factors of production, labour and capital. This equates to summing total wages, salaries and supplements earned by households and total gross operating surplus (this approximates profit before tax and depreciation and excludes interest flows) earned by businesses in the economy. In order to account for the total value of production under this method it is necessary to add indirect taxes paid to government and deduct subsidies received from government. This approach provides GDP(I), the income measure.

The third method is the expenditure approach. Under this method the total value of production is measured as the total value of final demand for goods and services produced in the economy. The term 'final' is used to indicate that the goods and services are not further transformed in any domestic production processes. Final demand is measured as consumption by households and governments plus private and public capital expenditure plus changes in stocks plus exports less imports. Imports are subtracted since they are produced overseas. This approach provides GDP(E), the expenditure measure.

The three measures can be more formally represented as follows:

$$\text{GDP (P)} = \text{Total Output} - \text{Input costs of goods and services}$$

(1)

$$\begin{aligned}
 \text{GDP(I)} &= \text{Wages, salaries and supplements} \\
 &+ \text{Gross operating surplus} \\
 &+ \text{Indirect taxes paid to government} \\
 &- \text{Subsidies received from government} \\
 &\hspace{15em} (2)
 \end{aligned}$$

$$\begin{aligned}
 \text{GDP(E)} &= \text{Final consumption by households} \\
 &+ \text{Consumption by governments} \\
 &+ \text{Capital expenditure} \\
 &+ \text{Change in stocks} \\
 &+ \text{Exports} \\
 &- \text{Imports} \\
 &\hspace{15em} (3)
 \end{aligned}$$

## Industry Comparisons

Generally, analysts use the GDP(P) approach in attempts to compare the production of various activities within the economy. GDP(P) is compiled, and is logically viewed, from an industry perspective. In order to define the contribution to GDP of an industry, a simple ratio is derived equal to the value-added of the industry divided by the total value-added for the economy, GDP(P).

In order to show how to apply this method to tourism consider the data in Table 3. The data replicate Table 1 but an additional column has been included to split expenditure by visitors between businesses and households. All expenditure by non-visitors is assumed to be by households.

**TABLE 3. SUPPLY-USE DATA**

	Industries		Expenditure by visitors		Expenditure by non-visitors:	Total expenditure
	Hotels	Restaurants	Business	Household	Household	
Commodities						
Accommodation			100	190	10	300
Meals			40	60	100	200
Commodity inputs	40	100				
Wages	160	60				
Operating surplus	95	40				
Indirect taxes	5	0				
Total production	300	200				

(data are illustrative only)

Assuming there are only two industries in the economy GDP(P) is estimated as:

$$\text{GDP(P)} = \text{Total production} - \text{Total input costs}$$

$$\begin{aligned}
&= \text{Total value-added} \\
&= (300 + 200) - (40 + 100) \\
&= 360
\end{aligned}$$

Much of the total output is purchased by visitors but 100 of meals and 10 of accommodation is purchased by non-visitors. Consequently, the tourism contribution cannot be 100%.

To derive the tourism contribution each industry must be considered in turn. For the restaurant industry exactly half of the output is purchased by visitors and thus half of the value-added (production less input costs) can be considered part of tourism's contribution to total GDP. For the hotel industry almost all output is purchased by visitors. An appropriate proportion of value added is 290/300. A formula for the tourism component of restaurant value-added is --

Tourism value-added:

$$\begin{aligned}
\text{Restaurants} &= \text{Value-added} \times \text{Tourism} \\
&\quad \text{proportion} \\
&= (200 - 100) \times 1/2 \\
&= 50
\end{aligned}$$

Similarly, for the hotel industry --

$$\begin{aligned}
\text{Hotels} &= \text{Value-added} \times \text{Tourism} \\
&\quad \text{proportion} \\
&= (300 - 40) \times 290/300 \\
&= 251.2
\end{aligned}$$

Thus, for the whole economy:

$$\begin{aligned}
\text{Tourism share GDP} &= (\text{Tourism value-added: Hotels} \\
&\quad + \text{Tourism value-added:} \\
&\quad \text{Restaurants}) / \text{GDP(P)} \\
&= (251.3 + 50) / 360 \\
&= 83.7\%
\end{aligned}$$

The derivation of results in this example is relatively straightforward since each industry only produces one commodity and each commodity is only produced by one industry. Nonetheless, in more complex situations the basic methodology, as used above, will be applicable.

To estimate a tourism contribution to GDP from the expenditure side a total GDP(E) must be derived. Using formula (3) GDP(E) will equal:

$$\begin{aligned}
\text{GDP(E)} &= \text{Final consumption by} \\
&\quad \text{households: visitors} \\
&= \text{Final consumption by} \\
&\quad \text{households: non-visitors} \\
&= 250 + 110 \\
&= 360.
\end{aligned}$$

This result is the same as derived for GDP(P). However, by directly calculating tourism's contribution using the GDP(E) formula a possible result is:

$$\begin{aligned}
\text{Tourism share GDP} &= \text{Final consumption by} \\
&\quad \text{households:visitors} \\
&\quad / \text{GDP(E)} \\
&= 250 / 360 \\
&= 69.4\%
\end{aligned}$$

This result is substantially different from that obtained using the GDP(P) approach. The explanation is that in calculating tourism's contribution the effect of expenditure by business is omitted.



To account for business expenditure correctly it must be recognised that GDP is a measure of economic production whether estimated using GDP(P) or GDP(E). Thus a share of GDP(E) for a commodity represents that commodity's share of economic production rather than a share of final demand. A solution is to derive an alternative version of GDP which correctly allows analysis at a commodity level. The following formula adjusts GDP(E) such that it can be viewed correctly from a commodity perspective. The revised measure is called GDP(E\*).

$$\begin{aligned}
 \text{GDP (E*)} = & \text{Final consumption by households} \\
 & + \text{Consumption by governments} \\
 & + \text{Capital expenditure} + \text{Change in stocks} \\
 & + \text{Exports} - \text{Imports} \\
 & + \text{Expenditure by resident businesses on commodity inputs} \\
 & - \text{Commodity input costs incurred by resident businesses in producing all commodities}
 \end{aligned}
 \tag{4}$$

The variation from the GDP(E) formula is in the last two terms. GDP(E\*) adds on the total business expenditure by resident firms on inputs of goods and services, both domestically produced and imported and deducts commodity input costs incurred in producing output. Since total business expenditure on commodity inputs must equal the total commodity input costs of domestically produced output, GDP(E\*) will equal GDP(E) at the total economy level. However, the application of GDP(E\*) at a commodity level will yield different shares of GDP compared to use of the GDP(E) formula. For example, business expenditure on air travel is likely to be different from the commodity input costs involved in producing air travel. Consequently, the net result for the final two terms in GDP(E\*) will not be zero and thus GDP(E\*) for air travel will differ from GDP(E) for air travel. The total effect of this adjustment on tourism shares of GDP will depend on the relationship between business expenditure on tourism commodities and the commodity input costs of producing tourism commodities.

To apply the GDP(E\*) formula to tourism it is necessary to determine which commodities are purchased by visitors. Then the tourism expenditure on each commodity for each of the items in formula (4) needs to be estimated and input costs deducted appropriately. This process will derive Tourism GDP(E\*) for each commodity. The total contribution of tourism is estimated as the sum of Tourism GDP(E\*) over all commodities divided by total GDP.

In terms of the example the following results are obtained. Recall that the proportion of tourism expenditure for accommodation is 290/300 and for meals it is 1/2. These proportions are used to calculate input costs appropriately. Note that there are no imports or exports in this example. The following formulae are derived:

$$\begin{aligned}
 \text{Tourism GDP(E*)} = & \text{Final consumption of households: visitors} \\
 \text{Accommodation} & + \text{Business expenditure} \\
 & - [ \text{Input costs} \times \text{Tourism proportion} ] \\
 = & 190 + 100 - [ 40 \times (290/300) ] \\
 = & 251.3
 \end{aligned}$$

### Tourism GDP(E\*) Meals

$$\begin{aligned} &= 60 + 40 - [ 100 \times (100/200) ] \\ &= 50 \end{aligned}$$

Recall that total GDP equals 360. THus the total tourism contribution equals:

$$\begin{aligned} \text{Tourism share GDP} &= ( \text{Tourism share GDP( E*)} \\ &\quad \text{Accommodation} \\ &\quad + \text{Tourism GDP(E*) Meals} ) \\ &\quad / \text{GDP} \\ &= (251.3 + 50) / 360 \\ &= 83.7\% \end{aligned}$$

This result is exactly the same as calculated using the value-added approach.

The conclusion to be drawn from this analysis is that tourism's contribution to GDP can be calculated from either a commodity or an industry perspective but importantly, under either approach, the same result is obtained.

A final comment on tourism's contribution relates to the calculation of tourism impacts and indirect effects of tourism. Often analysts wish to derive effects of tourism; for example, they may attempt to determine the effect of an increased demand for meals on demand for beef. Alternatively, analysts may want to trace through the demand for various commodities required in the production of tourism related commodities. The measurement of these impacts and effects is not part of the tourism contribution estimates described above. Tourism contribution to GDP does not measure the indirect effect of tourism in terms of demand for extra commodities and it does not reflect the effect of external impacts on tourism expenditure. Rather, tourism contribution to GDP refers to the extent to which tourism has contributed to total production over a given period of time. It measures the significance of tourism using a method which is consistent with the measurement of the contribution of other industries in the economy. The calculation of indirect effects and tourism impacts requires additional analysis which is not described here.

## THE BENEFITS OF A TSA

This section identifies some of the broad range of benefits that a TSA could provide to tourism research, tourism planners and tourism associated organisations. Five significant, broad level, benefits have been identified:

- i. The two dimensions of a TSA would provide a comprehensive set of economic data on tourism. The data available could provide an invaluable reference tool for tourism researchers, policy developers and industry representatives. Discussion on the economic aspects of tourism often occurs and a TSA could be widely used as an accepted and credible information base.
- ii. A TSA would provide an objective and comparable measure of the relative economic size of tourism through a link to GDP. Given the importance of the national accounts, and their generally accepted analytical usefulness, linking tourism to the national accounts through a TSA would give additional credibility to the measure of tourism's economic role.
- iii. The co-ordination of the tourism supply-use table with employment data, e.g. census profiles, would provide a valuable data connection for investigation of tourism employment issues. This is perhaps one of the key areas of tourism economic research and a TSA could be of great assistance.
- iv. There are extensive applications of a TSA in tourism research. In particular, the supply-use framework can assist tourism impact studies. These studies can look at the effect of taxes on tourism demand or the impact of international tourism, among many other issues. Generally, studies use input-output models or computable general equilibrium analysis to derive results but each method requires supply-use data as an information base. The

identification of the economic structure of tourism supply and demand within a TSA would reduce the need to make assumptions within impact models and thus allow more focus on analysis of the impacts rather than the models themselves.

- v. Much impact analysis is regionally focused but is often based on national supply-use tables. Point (iv) referred to the benefits of a TSA for national tourism impact studies and the same arguments can be extended to the case of regional tourism analysis. A national level source of tourism-specific economic data could assist in the measurement of the regional effects of tourism. Certainly, the general methodologies and definitions used at the national level would be applicable in a regional situation.

## CONCLUSION

This paper introduces the basic concepts of a TSA to allow those within the tourism statistics user community to understand more fully the scope of a TSA and its possible uses. A TSA has the potential to provide an integrated set of tourism statistics within the internationally recognised structure of national accounts and thus could be a useful policy and research tool with a wide range of benefits. While certain definitions and boundaries need to be drawn, it is possible to define a TSA and to create a methodology which derives an appropriate integration of data. However, construction of a TSA would be a data-intensive and expensive exercise.

## FURTHER INFORMATION

For further information relating to the development of the ATSA, contact John Joisce, Director, National Accounts Research Section, ABS on telephone (02) 6252 6170 or facsimile (02) 6252 5380.

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### ENDNOTES

1. Evidenced by the Canadian tourism satellite account, the World Travel and Tourism Council (WTTC)/WEFA (formerly known as Wharton Economic Forecasting Associates) work and the recent release of draft satellite account guidelines by the World Tourism Organisation (WTO). The Organisation for Economic Co-operation and Development (OECD) is also developing a model.
2. FA supply-use table has the mechanics of an input-output table but has commodities and industries as its dimensions rather than industry-industry or commodity-commodity.
- 3.

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